TURCHIN, F. V.

"The Influence of the Potash-phosphate Base on the Utilization of Ammonia Nitrogen and that in Nitrate Form by Plants." F. V. Turchin, Chemisation Socialistic Agr IX, No 9, pp 13-20 (1940); Chem Zentr 1941, I, pp 1590; C. A. XXXIV, pp 4508 (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49, 8 April 1949

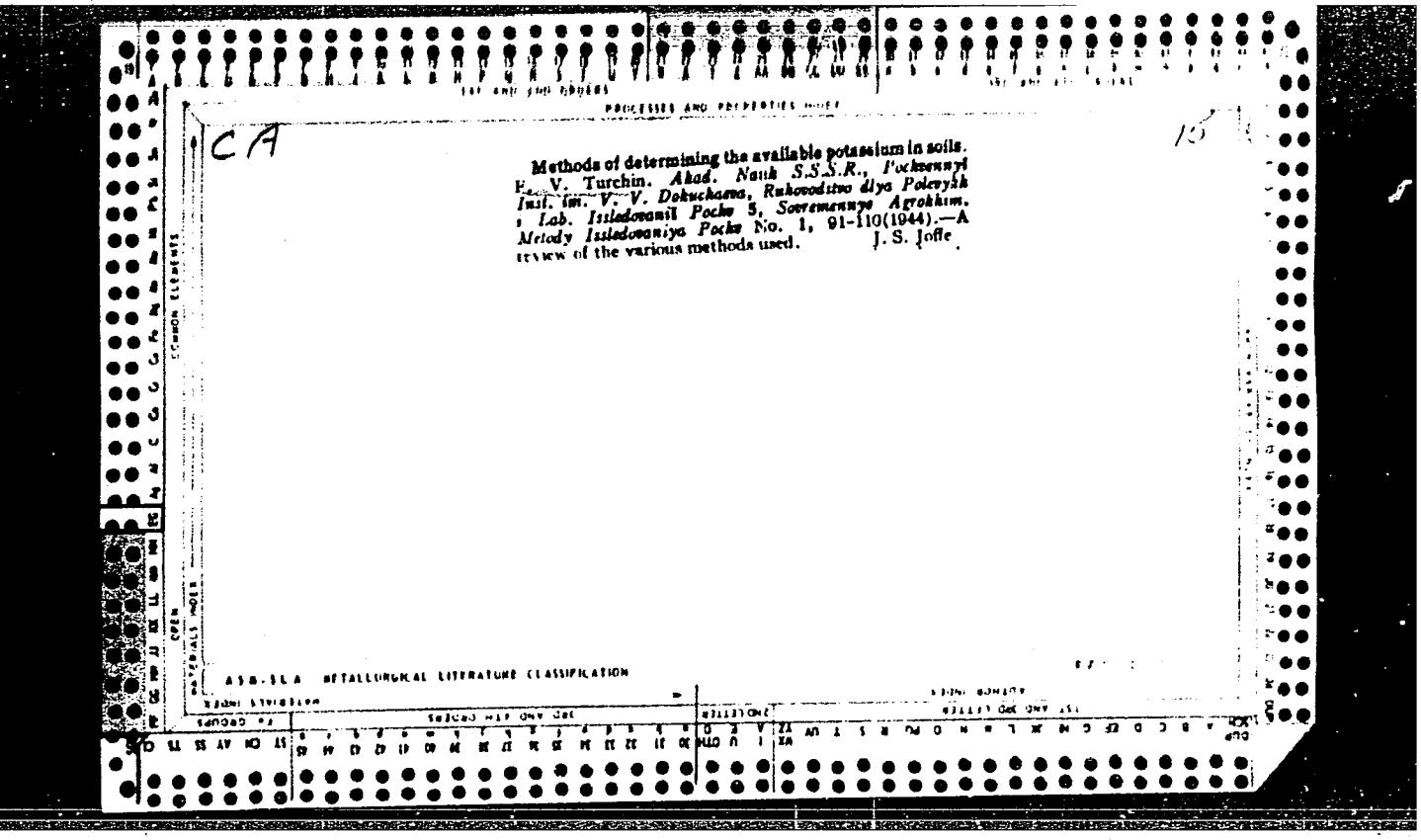
1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

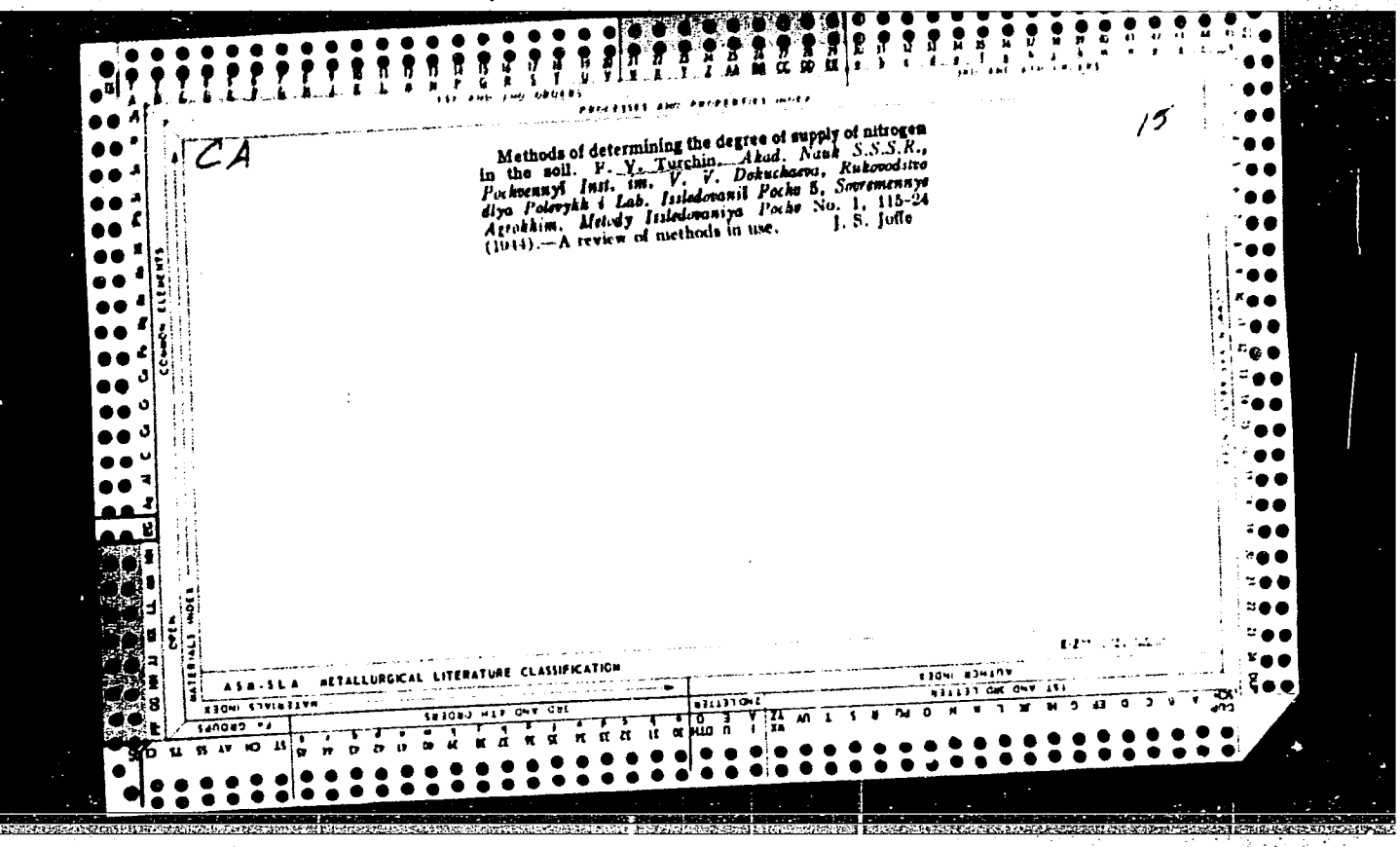
Comparative effectiveness of different forms of nitrate fertilizers. F. V. Turchin. *J. Chem. Ind.* (U. S. S. R.) 17, No. 1, 22-8(1940). The harmful effects of acid nitrogenous fertilizers on many soils can be overcome by adding of $CaCO_3$. The importance of adapting the fertilizer to the soil is stressed. H. M. Leicester

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

Methods of determining the available potassium in soils. E. V. Turchin. *Akad. Nauk S.S.S.R., Pochvennyi Inst. im. V. V. Dokuchaeva, Rukovodstvo dlya Polevykh i Lab. Issledovanii Pochv* 5, *Sovremennye Agrokhim. Metody Issledovaniya Pochv* No. 1, 91-110(1944).—A review of the various methods used. J. S. Joffe



CA

15

Methods of determining the degree of supply of nitrogen in the soil. P. Ye. Turchin. *Akad. Nauk S.S.S.R., Pochvennyi Inst. im. V. V. Dokuchaeva, Rukovodstvo dlya Polevykh i Lab. Issledovanii Pochv* 5, *Sovremennye Agrokhim. Metody Issledovaniya Pochv* No. 1, 115–24 (1944).—A review of methods in use. J. S. Joffe

'CA

15

Fertilizing value of Azotobacter preparations. F. V. Turchin. *Pedology* (U. S. S. R.) 1944, No. 6, 251-67 (in English, 267-8). T. repeated the expts. of Shulov... C. A. 36, ... and did not find the increases in yield reported. He points out that the N supposedly fixed by Azotobacter in the expts. reported by others would require an amt. of available carbohydrates which under the conditions of the expts. was not there.

L. S. Jaffe

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

C A

111

The influence of potassium on the utilization of nitrogen and on the synthesis of proteins in plants in relation to peculiarities in the composition of their carbohydrates. F. V. Turchin and L. I. Obolenskaya (Samoilov Inst. Fertilizer Insectofungicides, Moscow). *Doklady Akad. Nauk S.S.S.R.* 57, 81-4(1947); *Chem. Zentr.* 1949, I[illegible]-4; cf. *C.A.* 45, 3976*f*.—Plants with an aldosugar content (glucose type) are able to fix NH_3 nitrogen in their tissues only in the presence of a sufficiently high K concn. Expts. are reported in which chicory, sunflowers, and strawberries were grown in sand cultures. These plants have a high ketosugar content (fructose type). In contrast to the glucose-type plants, these plants were able to utilize N supplied as NH_4 salts quite as well as nitrate N, even in the presence of a K deficiency, without any damage to the plant (as the result of the NH_3). Fructose-contg. plants synthesize plant proteins while plants of the glucose type synthesize nonprotein-like compds. in the presence of a K deficiency.

M. G. Moore

CA

15

Active manganese in the soil and its toxicity in relation to the use of physiologically acid forms of nitrogenous fertilizers. F. V. Turchin and V. I. Sokolov. *Pochvovedenie* (Pedology) 1950, 550–60.—Soils treated with various sources of N ($NaNO_3$, $CaCN_2$, NH_4NO_3, $(NH_4)_2SO_4$, and NH_4Cl) release variable amts. of mobile Al and Mn; the $(NH_4)_2SO_4$-treated loam soil had the highest amt. of Al and Mn, 9.40 and 8.00 mg. per 100 g. of soil. Crops grown on the $(NH_4)_2SO_4$ plots took up large quantities of Mn. In 1944 and 1945, leaves of sugar beets had 182 and 327 mg. Mn per 100 g. of dry matter, resp. With $NaNO_3$ the same plants had 42.1 and 15.2 mg. Mn per 100 g. of dry matter. Plants that are not sensitive to Mn and Al (rye and oats in these expts.) can withstand a high concn. of acidity. Plants sensitive to acidity are also sensitive to Mn and Al. Clover was very sensitive to Al and less to Mn; sugar beets are sensitive to Al and Mn; alfalfa is very sensitive to Mn and less to Al; millet is sensitive to Mn. Lime immobilizes all of the mobile Al, but not all of the Mn, except when enough lime is added to neutralize the hydrolytic acidity. J. S. Joffe

1951

TURCHIN, F. V.

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
Biological Chemistry

Rate of renewal of protein and chlorophyll in the higher plants. F. V. Turchin, M. A. Guminskaya, and E. G. Plyshevskaya. *Izvest. Akad. Nauk S.S.S.R., Ser. Biol.* 1953, No. 6, 66-78.—By means of N^{15}-tracer methods employed with the N supply of oats, rye, and spinach plants, it was shown that protein synthesis begins in the plant with formation of constitutional proteins of the protoplasm; labeled N appears in these proteins within 1 hrs. of administration in the nutrient. The reserve proteins form from transformation of constitutional proteins, the latter not being infinitely stable as previously supposed. New protein syuthesis is paralleled by decline of disaccharides. Chlorophyll is constantly renewed and some 50% is renewed within 24 hrs. as shown by concn. of N^{15} accumulated in rye chlorophyll; in spinach the period is some 72 hrs. for 95.8% renewal. G. M. Kosolapoff

TURCHIN, F. V.

USSR/Agriculture - Book review

Card 1/1 : Pub. 124 - 23/24

Authors : Turchin, F. V., Prof.

Title : Scientific popular book on soil chemistry

Periodical : Vest. AN SSSR 9, 103-104, Sep 1954

Abstract : Critical review of the book by I. P. Serdobol'skiy, entitled, "The Chemistry of the Soil", published by the Academy of Sciences USSR in 1953, is presented.

Institution : ...

Submitted : ...

TURCHIN, F.V.

MD Nitrogen exchange of plants using nitrogen-15. F. V. Turchin, M. A. Guminskaya, and E. C. Plyshevskaya (Scient. Inst. for Fertilizers and Insecto-fungicides, Moscow). *Fiziol. Rastenii* 2, No. 1, 3-11(1955); cf. following abstr.—The relative rates of synthesis of amino acids (I) and proteins (II) in oats and timothy fed with $(N^{15}H_4)_2SO_4$ were studied. Renewal of II (estd. by isotope concn. of individual N fractions) was most rapid in young, rapidly growing plants and decreased with age, although total II and the ratio of individual II components remained practically const. Production of alanine was most rapid (noted in 5-30 mins.) with aspartic and glutamic acids next (noted in 1-2 hrs.). I were identified by chromatographic methods. There was 23.75% renewal of I in 24 hrs. Renewal of old II was noted in 2-6 hrs. and structural II was 91% complete in 72 hrs.; for residual II 120 hrs. was required for 91% renewal. Renewal of chlorophyll N was 95% complete in 72 hrs. Synthesis of new II was noted in 12-24 hrs. and was complete in 120 hrs. Synthesis of histidine and tryptophan was noted in 12-36 hrs. All other I appeared to be derived from alanine and the dicarboxylic I. If excess ammonium ion was given to the plant considerable asparagine was produced. A. W. Daly

FD-1/9

USSR/Chemistry - Ammonium nitrate TURCHIN, F.V.

Card 1/1 Pub 50-2/19

Author : Prof Turchin, F. V., Dr Tech Sci; Sokolova, V. I.

Title : The effect of additives on the quality of ammonium nitrate

Periodical : Khim. prom., No 2, 68-72 (4-8), Mar 1955

Abstract : On the basis of the tests described, conclude that phosphorite flour or apatite flour decomposed with nitric acid is a very effective additive to ammonium nitrate that reduces caking and increases the friability of this salt. Addition of dolomite proved less effective. Nine tables.

Institution: Scientific Institute of Fertilizers and Insectofungicides imeni Prof Ya. V. Samoylov

Turchin F.V.

Nitrogen nutrition and metabolism of plants with the aid of nitrogen-15. F. V. Turchin, M. A. Gaminskaya, and E. G. Plyshevskaya. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii 1955, Zasedaniya Otel. Biol. Nauk* 231-62(English summary, 252-3).—N^{15}-labeled $(NH_4)_2SO_4$ is used for N nutrition of oats and wheat under various conditions. The results show a continuous self-renewal of proteins in the plants, which is most active in young leaves in which within 90-100 hrs. almost all protein is renewed. Reserve proteins of the green parts are less rapidly renewed than are the constitutional proteins. In the roots the renewal process is slower. Mineral N is rapidly utilized for synthesis of amino acids in the roots (within 15 min.) the reserve proteins acting as carriers of the necessary enzyme systems. N of the pyrrole rings of chlorophyll is being constantly renewed (almost complete renewal in 100 hrs.). Illumination is an important factor in this phenomenon; even 6 hrs. in the dark causes a rapid decline of entry of N into the plant with simultaneous drop of amino acid synthesis. Renewal rate of proteins also falls off. G. M. Kosolapoff

(2)

Turchin, F.V.

600/1-EML

3991 AEC-tr-2435((Pt. 4) p.145-54))

STUDY OF THE NITROGEN NUTRITION AND METABOLISM OF PLANTS WITH THE USE OF THE N^{15} ISOTOPE. F. V. Turchin, M. A. Cuminskaya, and E. G. Plyshevskaya. p. 145-54 of CONFERENCE OF THE ACADEMY OF SCIENCES OF THE USSR ON THE PEACEFUL USES OF ATOMIC ENERGY, JULY 1-5, 1955. SESSION OF THE DIVISION OF BIOLOGICAL SCIENCE. (Translation). 10p.

This paper was originally abstracted from the Russian and appeared in Nuclear Science Abstracts as NSA 9-7660.

EML

Turchin, F. V.

Application of nitrogen-15 in a study of nitrogen nutrition and transformation in plants. F. V. Turchin, M. A. Guminskaya, E. G. Plyshevskaya, M. V. Tikhomirov, and V. V. Zertsalov. *Pochvovedenie* 1955, No. 7, 1–12.—Peat-sand and water cultures with standard nutrients were used to start the plants. Later, the cultures received $(NH_4)_2SO_4$ enriched with N^{15} in various amts. After definite intervals the plants were harvested and analyzed. The plants were exposed to this treatment from 15 min. to 240 hrs. In this manner it was possible to follow quantitatively the changes taking place in the respective N fractions. The results show that there is a continuous renewal of protein. This process is highly intensified in the tops of young plants. Within 72–120 hrs. all constitutional protein N is fully renewed. The reserve colloidally dissolved proteins are renewed much slower. The N^{15} appears in the constitutional proteins in much earlier stages than in the reserve proteins, which indicates that the synthesis of the former takes place earlier. Both types of proteins are formed much slower in the roots. The data show that 2 hrs. after adding the tagged N it could be detected in the form of amino acids. After 4 hrs. the N^{15} was detected in the chlorophyll and proteins. The mobile reserve proteins were found in the roots indicating movement from the leaves. It is postulated that the transformation of these is accomplished by enzyme systems which catalyze the synthesis of amino acids in plants. The intensity of amino acid formation and renewal of protein drops when plants are in the dark. J. S. Joffe

(4)

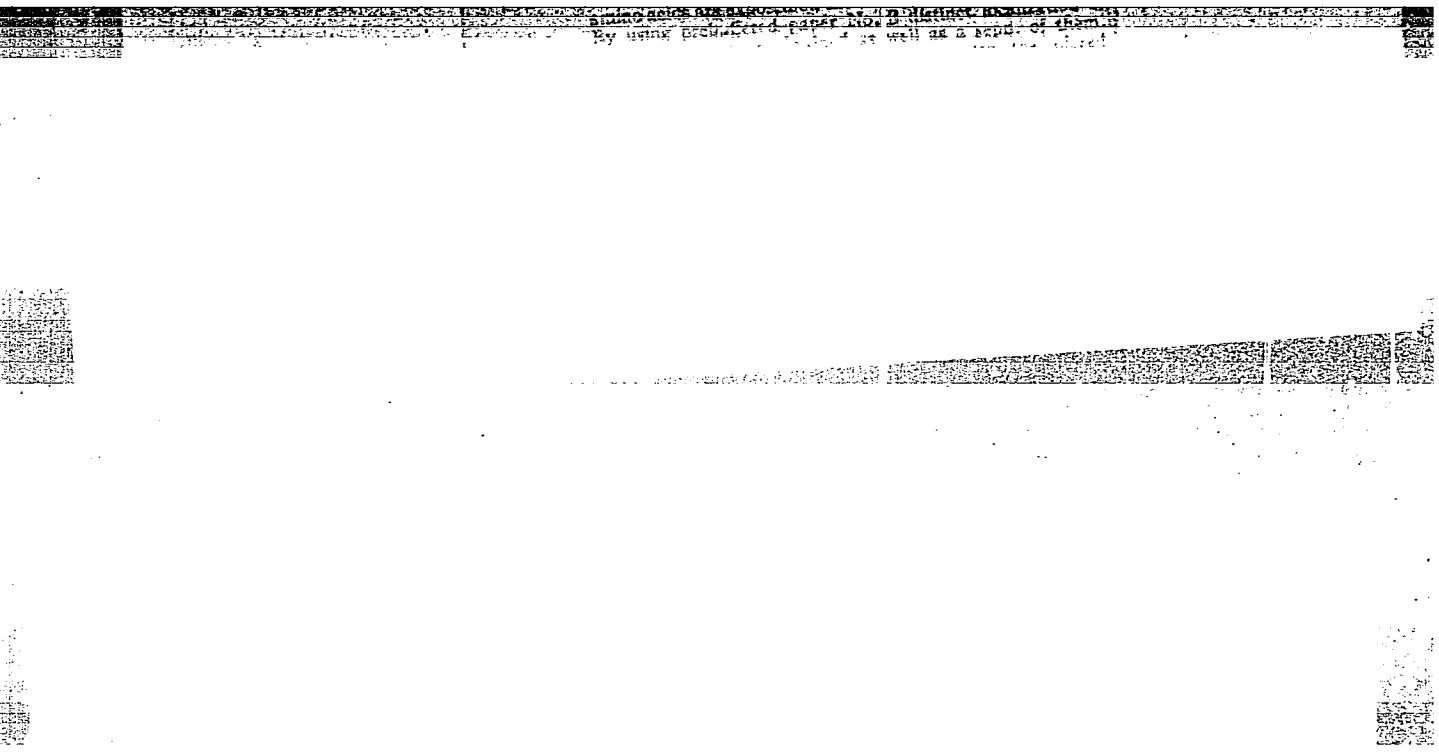
Turchin, F. V.

Study of the nitrogen nutrition and metabolism of plants with the aid of nitrogen-15. F. V. Turchin, M. A. Guminskaya, and E. G. Plyshevskaya. *Conf. Acad. Sci. U.S.S.R. on Peaceful Uses of Atomic Energy, Session Div. Biol. Sci.* 1955, 145–54(Engl. translation).—See *C.A.* 49, 16073c.
B. M. R.

TURCHIN, F.V.

Role of mineral and biological nitrogen in the agriculture of the U.S.S.R. [with French summary in insert]. Pochvovedenie no.6:15-29 Je '56. (MLRA 9:10)

1. Nauchnyy institu po udobreniyam i insektofungisidam Ministerstva khimicheskoy promyshlennosti SSSR.
(Plants, Effect of nitrogen on)



TURCHIN, Fedor Vasil'yevich, professor; KATSNEL'SON, S.M., redaktor; GUBIN, M.I., tekhnicheskiy redaktor

[Liquid nitrogen fertilizers] Zhidkie azotnye udobreniia. Predstavleno prezidiumom pravleniia Obshchestva po rasprostraneniiu politicheskikh i nauchnyy znanii RSFSR. Moskva, Izd-vo "Znanie," 1957. 31 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.5, no.8) (MLRA 10:9)
(Fertilizers and manures)
(Plants, Effect of ammonia on)

TURCHIN, F.V.

GODNEV, T. N., TURCHIN, F. V. and SHLYKH, A. A. (Minsk)

"Renewal of Chlorophyll and Proteins in Plants."

paper presented at the Intl. Conference on Radioisotopes in Scientific Research in Paris, 19-20 Sept 1957.

Angewandte Chemie, No. 3, 1958.

TURCHIN, F.V., doktor sel'skokhozyaystvennykh nauk, professor.

Use of mineral fertilizers in foreign countries. Khim.prom. no.3:181-187 Ap-My '57. (MIRA 10:7)

1. Nauchnyy institut po udobreniyam i insektofungitsidam imeni professora Ya.V. Samoylova.
(Fertilizers and manures)

TURCHIN, F.V.

J-3

USSR/Soil Cultivation. Mineral Fertilizers.

Abs Jour: Ref. Zhur-Biologiya, No 1, 1958, 1235.

Author : Turchin, F.V.
Inst : NIUIF
Title : Prospects for Application of Lime-Ammonium Nitrate in the Non-Chernozem Belt of the USSR

Orig Pub: Udobreniye i urozhay, 1956, No 11, 30-37.

Abstract: Many years of experiments in the NIUIF have proven that when the potentially acid N_{aa}, or the even more acid N_a, have been utilized on podzolic soils for a comparatively long period, even crops like potatoes, flax, oats, and rye, which are rather little sensitive to soil acidity, begin to develop in a poorer manner. Neutralization of the potential acidity of ammonium nitrate, especially by using dolomite, causes a marked increase in the harvests (on sandy and sandy loam soils potatoes increase by 30 centners per

-3-

Card : 1/2

J

USSR/Soil Science - Mineral Fertilizers.

Abs Jour : Ref Zhur Biol., No 22, 1958, 100055

Author : Turchin, F.V.
Inst :
Title : The Application of Mineral Fertilizers in Foreign Countries.

Orig Pub : Khim. prom-st', 1957, No 3, 181-187

Abstract : The world production and consumption of mineral fertilizers increased particularly in the post-war period, doubling in 1955 (78.3 mil t) against the pre-war year of 1938 (36.9 milt), the principal bulk of which being used in the countries of Western Europe, U.S.A., Japan, Australia and New Zealand. In 1954-1955, on the average, mineral fertilizers were introduced at the rate of 57.9 kg in European countries (excluding USSR) and 29.3 kg in U.S.A. per 1 ha of the sowable area. Growth of the application of mineral fertilizers increased the grain

Card 1/2

USSR/Soil Science - Mineral Fertilizers. J

Abs Jour : Ref Zhur Biol., No 22, 1958, 100055

crops in Western Europe, on an average, of up to 30 centners per 1 ha, and in U.S.A. the wheat harvest increased against 1934-1938 from 8.7 to 14 and the corn harvest increased from 14.0 to 25 c/ha. The ratio of NP_2O_5: K_2O in the over-all use of mineral fertilizers in the countries of Europe is 1 : 1.4 : 1.5 and 1 : 1.1 : 0.9 in U.S.A. -- N.N. Sokolov

Card 2/2

J

USSR / Soil Science. Mineral Fertilizers.

Abs Jour : Ref Zhur - Biologiya, No 11, 1958, No. 48648

Author : Turchin, F. V.
Inst : Not given
Title : The Role of Mineral and Biological Nitrogen in Agriculture of the Union of Soviet Socialist Republics

Orig Pub : Pochvovedeniye, 1956, No 6, 15-29

Abstract : The report of the All-Union Conference of Soil Scientists of 28 January 1956-4 February 1956 according to data of experimental establishments and kolkhozes (collective farms), lists nitrogen fertilizers as particularly effective in regions of sufficient moisture - in non-Chernozemic zones and in the northern part of Chernozemic zones. With insufficient moisture in the

Card 1/3

USSR / Soil Science. Mineral Fertilizers. J

Abs Jour : Ref Zhur - Biologiya, No 11, 1958, No. 48648

soil, nitrogen is absorbed quite well by the plants, but it is not utilized in the synthesis of organic matter. The azobacter organism under favorable conditions, can store nitrogen in the soil for a year, though not more than 20 25 kg/hectare. The effectiveness of sowing perennial leguminous grasses, clover and alfalfa, in the presence of nitrogen collectors, is determined by the level of their productivity. The effectiveness of clover with a high harvest of grasses is equivalent to ~80 kg. of mineral nitrogen. The effectiveness of a layer of clover and timothy grass mixture on far lower sowings of pure clover is practically equal to a harvest of hay. A study of biological binding of nitrogen in leguminous tubercles showed that

Card 2/3

Abs Jour : Ref Zhur - Biologiya, No 11, 1958, No. 48648

atmospheric nitrogen is not fixed in the bodies of the bacteria, but on the surface of the tubercle root tissues. Chromatographic analysis showed a uniform composition of amino acids in the organic matter of podzolic and chernozem soils, whereas the first soil contained more glutamic acid, the latter soil contained more aspartic acid and glycine. -- A. G. Kalmykov

J-2

USSR/Soil Science. Soil Biology

Abs Jour : Ref Zhur - Biol., No 10, 1958, No 43834

Author : Turchin F.V.
Inst : Not Given
Title : New Types of Mineral Fertilizers

Orig Pub : Vestn. s.-kh. nauki, 1956, No 2, 17-20 (res. Eng., Ger.)

Abstract : The basis of selecting the assortment of mineral fertilizers for the 6th five-year plan in the USSR and the distribution of production of new kinds are presented. Among the nitrogen fertilizers a leading place in the assortment is occupied by ammonium nitrate, and in the rayons of the non-chernozem belt by calcium and calcium ammonium nitrate. Sugar beets' need of sodium nitrate should be completely satisfied. Liquid ammonia and ammoniates may find widespread application for the basic fertilizer and the side-dressing of plowed crops. Urea is most suitable for top-dressing and for irrigation fertilization in vegetable raising, and horticulture as well as flowercultivation. Phosphorus fertilizers, gran-

Card : 1/2

Abs Jour : Ref Zhur - Biol., No 10, 1958, No 43834

ulated P_c (both ordinary and double) are rationally used for row application and for side-dressing. Ammoniated P_c was rated highly in production conditions of cotton raising. Prospective thermal phosphates are defluorinated and smelted magnesia phosphate. The assortment of potassium fertilizers was basically potassium chloride and in a small quantity kainite and mixed salts. It is necessary to develop the production of non-chlorine potassium fertilizers. Among the complex fertilizers ammonphos appears as the most promising in the cotton raising and beet producing rayons of the USSR, as well as on soils saturated with bases. Ammoniated ammonium superphosphate is very well suited for use as a basic fertilizer on sugar beets, cotton and other agricultural crops. -- A.M. Shchepetil'nikova.

5(1)
AUTHORS: Vol'fkovich, S. I., Turchin, F. V., Ioffe, Ya. A., Levin, A. M.

SOV/64-59-2-5/23

TITLE: Prospects of the Production and Application of Mineral Fertilizers in East Siberia (Perspektivy proizvodstva i primeneniya mineral'nykh udobreniy v Vostochnoy Sibiri)

PERIODICAL: Khimicheskaya promyshlennost', 1959, Nr 2, pp 112-115 (USSR)

ABSTRACT: If all seed areas in East Siberia (ES) were to be supplied with mineral fertilizers (MF) in the normal dosage, a yearly amount of 408000 T of N_2, 426000 T of P_2O_5, and 514000 T of K_2O would be necessary. Data concerning this subject published by the Sovet po izucheniyu proizvoditel'nykh sil pri AN SSSR (SOPS) (Council for the Study of Productive Forces at the AS USSR (SOPS) are lower because woods and meadows were not taken into account. With respect to the industrial development in (ES) for the coming 7-10 years a yearly amount of 60000 T of N_2, 100000 T of P_2O_5, and 60000 T of K_2O would be necessary for a systematic supply and according to pre-calculations for the year 1975 (for 6600000 hectares) 205000 T of N_2, 211000 T of P_2O_5, and 180000 T of K_2O. The

Card 1/3

assortment of the (MF) should consist mainly of concentrated (MF) in order to reduce transportation costs. The high percentage of transportation costs in the price of simple superphosphate is illustrated in a table for 3 works of fertilizers (Table). Besides ammonium nitrate, urea (with 43% N_2) is an important MF as well as the combined nitrogen-phosphorus-potassium fertilizers are an important branch of production; in this connection nitric acid treatment of phosphates to nitrophos and nitrophoska is of special interest. For the development of a phosphorus fertilizer industry by extraction of phosphoric acid from natural phosphates only the remote Noril'sk complies with the corresponding prerequisites. The following deposits are taken into consideration for the production of MF in ES: The problem of exploitation of the gypsum deposits in the Irkutsk and other areas has still to be investigated. The phosphorite deposits at the Katanga, the area of the tributary of the Yenisey-Podkamennaya Tunguska (Ref 1), which are already being exploited, as well as the areas near Slyudanka and on the Lake Baykal, the phosphorite deposits between the Angara-Ili district and the Bratsk Electric-power Station, as well

as the biggest phosphorite deposits of Khibiny and Kara Tau. The three power plants in Bratsk, Krasnoyarsk, and Yeniseysk are regarded as the basis of the production of concentrated fertilizers from electrothermal phosphoric acid, the capacity of which is computed. Potassium fertilizers will not be produced in ES before 1965, they will be supplied from Berezniki and Solikamsk. Borine fertilizers may be produced from the Kara Tau phosphorites containing 36% P_2O_5 and 7-8% H_3BO_3. According to approximate calculations, capital investment for a complete supply of ES with nitrogen- and phosphorus fertilizers will be approximately 4 billion rubles. If potassium and phosphorus prospecting proves to be successful and the necessary industry will be built up in ES, the total sum of capital investment will rise to about 5,2 billion rubles. There are 1 table and 4 Soviet references.

TURCHIN, F.V.

Recent data on atmospheric nitrogen fixation in nodules of leguminous plants. Pouchvovedenie no.10:14-24 O '59. (MIRA 13:2)

1. Nauchnyy institut po udobreniyam i insektofungisidam.
(Legumes) (Nitrogen--Fixation)

Country : USSR
Category : Soil Science. Fertilizers. General. J

Abs Jour : RZhBiol., No 6, 1959, No 24637

Author : Turchin, F. V.
Inst :
Title : Concerning the Perspective Requirements of USSR Agriculture in Mineral Fertilizers and in Their Expedient Assortment.
Orig Pub : Udobreniye i urozhay, 1958, No. 8, 7-12

Abstract : No abstract.

Card : 1/1

TURCHIN, F.V.

Studying nitrogen nutrition and nitrogen metabolism in plants by means of the isotope N^{15}. [Trudy] NIUIF no.164:67-68 '59. (MIRA 15:5)

(Plants--Metabolism) (Nitrogen--Isotopes)

TURCHIN, F.V.

Agrochemical investigation of mixed fertilizers. [Trudy] NIUIF no.164:64-67 '59. (MIRA 15:5)
(Fertilizers and manures)

TURCHIN, F.V.

Agrochemical evaluation of new nitrogen fertilizers and methods for improving their quality. [Trudy] NIUIF no.164:63-64 '59. (MIRA 15:5)

(Nitrogen fertilizers)

KATALYMOV, M.V., otv.red.; KOROLEV, L.I., red.; SOKOLOV, A.V., red.; TURCHIN, F.V., red.; UNANYANTS, T.P., red.; DOLGOPOLOV, M.I., red.; GRIGOR'YEVA, A.I., red.; BALLOD, A.I., tekhn.red.

[Manual on mineral fertilizers; theoretical and practical aspects of their use] Spravochnik po mineral'nym udobreniiam; teoriia i praktika primeneniia. Moskva, Gos.izd-vo sel'khoz. lit-ry, 1960. 551 p. (MIRA 14:1)
(Fertilizers and manures)

TURCHIN, F.V.

"Transformation of Nitrogen in Soils."

(Soil Institute im.V.V.Dokuchayev)
report to be presented at the 7th Intl Soil Science Congress, Madison, Wisconsin, 15-23 Aug 1960

TURCHIN, F.V.

Prospective use of mineral fertilizers in the U.S.S.R.
Pochvovedenie no.5:1-4 My '60. (MIRA 14:4)

1. Nauchnyy institut po udobreniyam i insektofungisidam.
(Fertilizers and manures)

TURCHIN, F.V., prof.; SOKOLOVA, V.I.

Using ammonium bicarbonate as fertilizer. Zemledelie 23 no.12: 73-79 D '61. (MIRA 15:1)

1. Nauchnyy institut po udobreniyam i insektofungisidam.
(Ammonia as fertilizer)

TURCHIN, F.V.; BERSENEVA, Z.N.; ZHIDKIKH, G.G.

Atmospheric nitrogen fixation in vitro by enzymatic preparations isolated from the nodules of legumes and from higher plants not infected with bacteria. Dokl.AN SSSR 149 no.3:731-734 Mr '63. (MIRA 16:4)

1. Nauchnyy institut po udobreniyu i insektofungitsidam. Predstavleno akademikom S.I.Vol'fkovichem.
(Nitrogen--Fixation) (Enzymes)

BALASHEV, L.L., prof.; GRIGOR'YEV, N.G., kand. biol. nauk; ZHURBITSKIY, Z.I., prof.; PETERBURGSKIY, A.V., prof.; POPOV, P.V., kand. sel'khoz. nauk; RADKEVICH, P.Ye., prof.; SOKOLOV, A.V.; TURCHIN, F.V., prof.; SHKONDE, E.I., kand. sel'khoz. nauk; SHTERNBERG, M.B., kand. biol. nauk; VOL'FKOVICH, S.I., akademik, red.; KORNEYEV, N.Ye., kand. veter. nauk, red.; NAYDIN, P.G., prof., red.; PLESHKOV, B.P., kand. sel'khoz. nauk, red.; POPOV, I.S., akademik, red.; ROMASHKEVICH, I.F., kand. sel'khoz. nauk, red.; RODE, A.A., prof., red.; ROZOV, N.N., prof., red. FATUYEV, M.R., inzh., red.

[Chemicalization of agriculture; scientific and technical dictionary handbook] Khimizatsiia sel'skogo khoziaistva; nauchno-tekhnicheskii slovar'-spravochnik. Moskva, Nauka, 1964. 398 p. (MIRA 17:10)

1. Chlen-korrespondent AN SSSR (for Sokolov). 2. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk imeni V.I.Lenina (for Popov)

TURCHIN, F.V., prof.

Utilization of nitrogen fertilizers by crops and their conversion in the soil. Zhur.VKHO 10 no.4:400-407 '65.
(MIRA 18:11)

TURCHIN, F.V., prof., doktor sel'skokhoz. nauk (Moskva)

Needs of the northwestern areas of the U.S.S.R. in nitrogen fertilizers and their adequate assortment. Trudy LIEI no.37: 14-24 '61. (MIRA18:4)

LITVINENKO, V.; SKRYPKA, K.; TURCHIN, I.; SKVORTSOVA, A.; BOYKO, A.; VDOVIN, P.

Noncontractual relations between the wholesale and retail trade. Sov. torg. 36 no.1:33-37 Ja '63. (MIRA 16:2)

1. Direktor Bogodukhovskogo smeshtorga (for Litvinenko). 2. Upravlyayushchiy L'vovskoy bazoy "Ukroptgalantereya" (for Skrypka). 3. Glavnyy tovaroved Krymskoy bazy "Ukroptekstil'torga" (for Turchin). 4. Upravlyayushchaya Krymskoy bazoy "Ukroptgalanterei" (for Skvortsova). 5. Glavnyy tovaroved Krymskoy bazoy "Ukroptgalanterei" (for Boyko). 6. Upravlyayushchiy respublikansoy bazoy "Moldgalantereya" (for Vdovin).
(Ukraine—Commerce)

TURCHIN, I.

Organization of the textile trade can be improved. Sov.torg. 33 no.6:61 Je '60. (MIRA 13:7)

1. Glavnyy tovaroved Krymskoy oblastnoy torgovoy bazy Ukroptteksstil'-torga, g. Simferopol'.
(Textile industry)

BRDLIK, P. M.; TURCHIN, I. A.

"Heat transfer by natural convection near a vertical flat surface with discrete-distributed injection."

report submitted for 2nd All-Union Conf on Heat & Mass Transfer, Minsk, 4-12 May 1964.

Sci Res Inst Structural Physics.

MALOZEMOV, V.V.; TURCHIN, I.A.

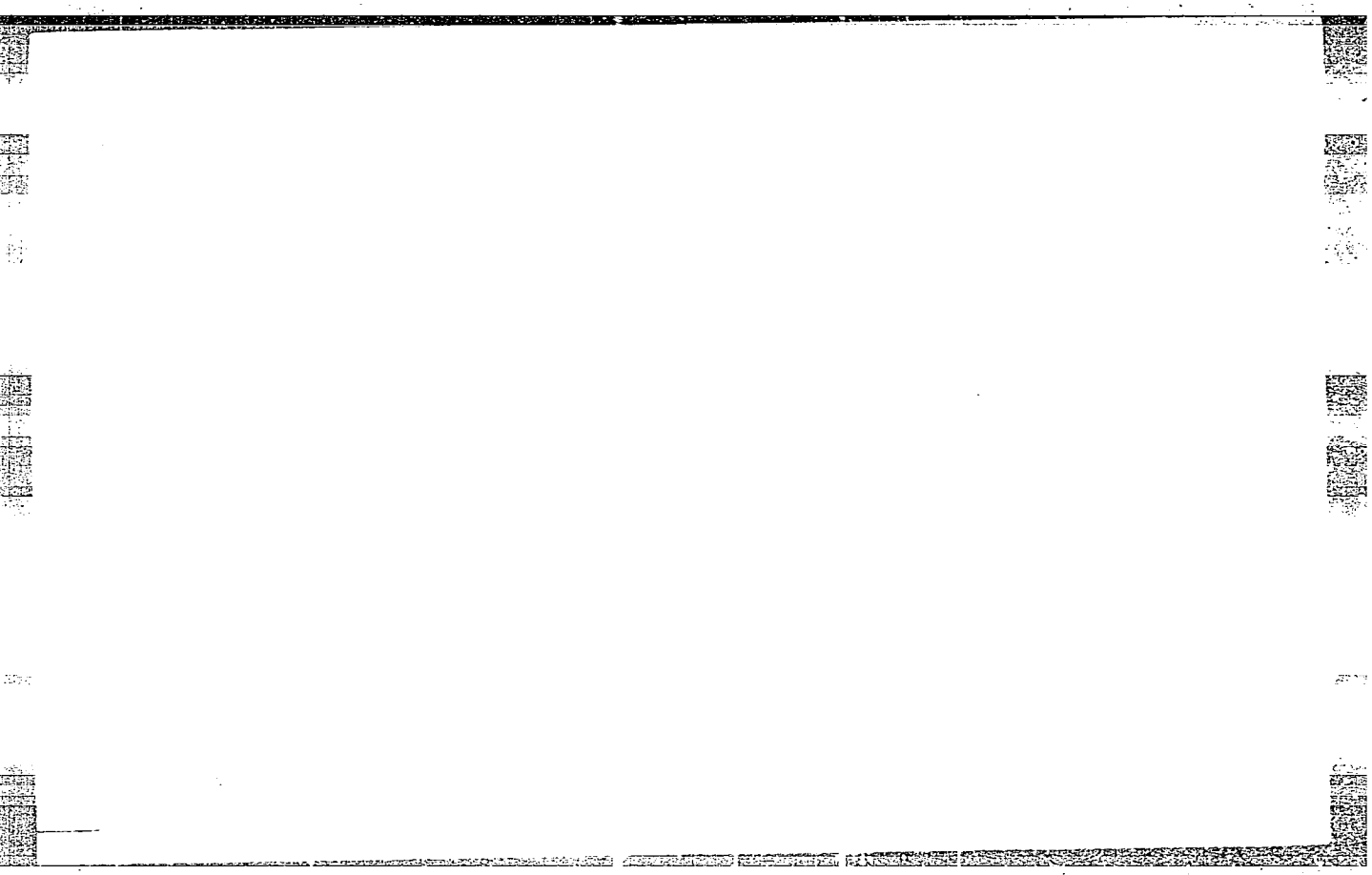
Using an interferometer in determining temperature fields. Inzh.-fiz. zhur. 8 no.2:182-185 F '65. (MIRA 18:5)

1. Institut stroitel'noy fiziki, Moskva.

BRDLIK, P.M.; TURCHIN, I.A.

Effect of discretely distributed air blowing and suction on heat transfer with natural convection at a vertical surface. Inzh.-fiz. zhur. 8 no.2:268-272 F '65. (MIRA 18:5)

1. Institut stroitel'noy fiziki, Moskva.



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757520003-1"

SUBMITTED: 13May84

L 24402-66 EWT(1)/ETC(f)/EPF(n)-2/EWG(m) WW/GS

ACC NR: AT6006916 SOURCE CODE: UR/0000/65/000/000/0299/0304

AUTHOR: Brdlik, P. M.; Turchin, I. A.

ORG: Scientific research institute for Construction Physics, Moscow (Nauchno-issledovatel'skiy institut stroitel'noy fiziki)

TITLE: Effect of a discrete distribution of blowing and suction on heat transfer in natural convection on a vertical surface

SOURCE: Teplo- i massoperenos. t. II: Teplo- i massoperenos pri vzaimodeystvii tel s potokami zhidkostey i gazov (Heat and mass transfer. v. 2: Heat and mass transfer in the interaction of bodies with liquid and gas flows). Minsk, Nauka i tekhnika, 1965, 299-304

TOPIC TAGS: convective heat transfer, heat transfer coefficient

ABSTRACT: The experiments were carried out in a specially constructed unit consisting essentially of a heat exchenger made of a large number (about 60) of copper plates 0.01 meters high and 0.3 meters thick, placed horizontally one above the other with a spacing of 0.5×10^{-3} meters. Blowing or suction was effected through slits between the plates. Determination of the temperature fields in the boundary layer (excluding the surface temperature of the plate itself) was done with an interferometer. Control thermocouples made of Chromel-Kopel wire with a

Card 1/2

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ACC NR: AT6006916

diameter [illegible] x 10^{-3} meters were located in the body of the plate. The temperature of the air entering [illegible] was [illegible] by thermocouples. The distance between the slits was varied over a range of 0.010 to 0.320 meters. The velocity of the blowing or suction of the air through the slits was varied from 0 to 10 meters/sec. The temperature difference between the walls and the surrounding air varied from 20 to 40°C. The experimental results are exhibited graphically. The regular nature of the change in the heat transfer coefficients as a function of the basic parameters makes it possible to correlate the experimental data by the following empirical relationship:

$$Nu_L = 0{,}5\,Gr_L^{1/4}\left(\frac{L}{h}\right)^{2{,}5\cdot10^{-4}\,Re_L^{0.5}},$$

in which L is the total height of the plate. Orig. art. has: 2 formulas and 3 figures.

SUB CODE: 20/ SUBM DATE: 09Nov65

Card 2/2 UDC

L 35844-66 EWT(1) JAJ/WW

ACC NR: AP6014983 SOURCE CODE: UR/0170/66/010/005/0573/0576

43

B

AUTHOR: Kudryavtsev, Ye. V.; Turchin, I. A.

ORG: Institute of Construction Physics, Moscow (Institut stroitel'noy fiziki)

TITLE: The dependence of unsteady-state heat transfer on the heat flux density

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 10, no. 5, 1966, 573-576

TOPIC TAGS: convective heat transfer, heat flux, hydrodynamics

ABSTRACT: The basic element of the experimental apparatus was a Nichrome ribbon with dimensions 157 x 20 x 7 x 10^{-3} mm. The ribbon was stretched between two copper prisms which served to lead in the current, and was placed in the field of a Type IZK-454 interferometer, along a vertical plane. Thus, the hydrodynamic process was determined by natural convection on both sides of the ribbon. Into the circuit were connected electrolytic condensers with a capacitance of 5000 microfarads, which served as accumulators of energy, and a variable resistance which made it possible to regulate the rate of discharge of the condensers and, consequently, the rate of change of the thermal stress. The charge on

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L 35844-66
ACC NR: AP6014983

the condensers was created from a 220 volt alternating circuit through two D-207 diodes connected in series and a 12 ohm resistance coil. During the experiments, measurements were made of the air temperature, and the current strength and voltage at the ends of the ribbon, the changes of which were recorded in a Type N-105 oscillograph with simultaneous photography. Experimental results are shown in a series of curves and photos. Of particular interest is a figure showing interferograms of the Nichrome ribbon for three different heating conditions, after the passage of an equal period of time, 0.417 sec, after the current was turned on. It is evident from the photo that the temperature of the surface of the ribbon and the distribution of the temperature in the boundary layer at the end of the stated interval of time are different. The highest surface temperature (49°C) corresponds to a maximum rate of heating the ribbon, and vice versa. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: 20Dec65/ ORIG REF: 002

Card 2/2

TUL'CHINSKAYA, V.P. [Tul'chyns'ka, V.P.], prof.; FEDOTOV, M.I.; ISHCHENKO, N.I.; TURCHIN, I.P. [Turchyn, I.P.]

Methods of differentiating immunodiagnostic reactions in animals vaccinated against and in animals suffering from brucellosis. Na dopom.sil'.hosp.ta vyr. no.5:15-18 '58. (MIRA 13:3)

1. Kafedra mikrobiologii Odesskogo gosuniversiteta. 2. Chlen-korrespondent AN USSR (for Tul'chinskaya).
(Brucellosis in cattle) (Vaccination)

TURCHIN, N., starshiy inzh.

Base paint instead of nitro-enamel. Mor.flot 21 no.1:39 Ja '61.

1. Glavsudkhoz Ministerstva morskogo flota.
(Marine engines--Painting)

KIRILLOV, P.L.; KOLESNIKOV, V.D.; KUZNETSOV, V.A.; TURCHIN, N.M.

Devices for measuring the pressure, flow, and level of fused alkali metals. Atom.energ. 9 no.3:173-181 S '60. (MIRA 13:8)
(Alkali metals)
(Atomic power plants--Equipment and supplies)

TURCHIN, N.M. (Moskva)

Effect of the conductivity of the wall on resistance to the motion of liquid metal along a round pipe in a magnetic field. Teplofiz. vys. temp. 1 no.1:118-120 Jl-Ag '63. (MIRA 16:10)

21 (1)

AUTHORS: Kirillov, P. L., Kuznetsov, V. A., Turchin, M. M., Fedoseyev, Yu. M.

SOV/89-7-1-3/26

TITLE: Some Designs and the Operation of Pumps for Sodium and Alloys of Sodium With Potassium (Nekotoryye konstruktsii i ekspluatatsiya nasosov dlya natriya i splavov natriya s kaliyem)

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 1, pp 11 - 17 (USSR)

ABSTRACT: The following pumps are described: 1. A centrifugal pump which is able to lift the liquid 23 m at 990 rpm and 55 m at 1450 rpm. In the former case, the pump conveys 10 m^3/h. The greatest difficulty is caused by the correct selection of the material for ball bearings and sealing the rotating axis towards the exterior. The following material is recommended for the pump, a sectional drawing of which is given: For the hub: steel RF-1 and for the bearing box: beryllium bronze BrB2. The space between hub and bearing box amounted to 0.2 - 0.25 mm in a cold state. All other parts of the pump are made from steel of the type 1Kh18N9T. The pump is driven by an asynchronous electric motor. After 1500 hours of operation with a sodium-potassium alloy at temperatures of 200 - 400°C, the ball bearings were already used up. The greatest disadvantage of these pumps is

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the fact that e.g. the ball bearings are difficult to exchange, and that it is difficult to take off the sealing cylinder. The pump was developed under the supervision of G. V. Skladnev and V. D. Rostovtsev. 2. Centrifugal pump with beryllium bronze ball bearings and an ordinary electromotor. This pump, a sectional drawing of which is given, is distinguished by the fact that the electric motor is completely enclosed and is water-cooled. A noble gas circulates within the pump. Also in this case the question of ball bearings is of decisive importance; after numerous experiments, the materials were selected, which were used for the first-described pump. The pump was tested for 2000 hours with a sodium-potassium alloy, and 7000 hours with sodium alone, at a temperature of 200°C. Besides the ball-bearing problem, a second difficulty arises, viz. the fact that during operation sodium vapors penetrate into the casing of the electric motor, which destroy the insulation of the motor coiling by the formation of hydroxide. The pump described was developed under the supervision of M. N. Ivanovskiy. 3. Centrifugal pump with a ball-bearing made from "frozen" sodium. The pump shown in form of a sectional drawing conveys about 25 m^3

of liquid per hour 100 m high (2960 rpm). The power developed by the electromotor is 14 HP. The finish of the ball bearing, which, at the same time, seals the rotating shaft towards the outside, is shown separately in form of a sectional view. This bearing may be cooled by means of water. The sodium loss amounts to 1 - 2 g/24 hours. The pumps operate 2000 hours at 400 - 500°C, and remain in operation. The construction of these pumps is by V. I. Orlov. 4. Conductive electromagnetic single-phase pump for alternating current. By means of this pump it is possible to convey 4 m^3 of metal per hour, in which case a resistance of 2 kg/cm^2 may be overcome. The brands of wire necessary for the coils are listed separately. This type of pump should be used only if small quantities are to be conveyed. The pump, which is shown by a figure, was constructed under the supervision of N. M. Turchin. 5. Electromagnetic induction pump. This pump consists of two parallel inductors between which there is a channel, through which the liquid metal is able to flow. The indentations of the inductors contain an 8-pole three-phase winding, which may be cooled by means of copper tubes, through

which water flows. The width of the channel is 150 mm, and its height in the case of one pump is 6.1 and in the case of the other 8.7 mm. In the interior of the channel copper elements are located at the same height as the ends of the inductors, which are the short-circuit rings for the rotor of the asynchronous motor. The pumps have been in operation for a long time at temperatures of 200 - 250°C (conveying output 30 m^3/h). I. A. Tyutin distinguished himself particularly in the course of the construction of this type of pump. There are 7 figures and 7 references, 3 of which are Soviet.

SUBMITTED: February 10, 1959

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AUTHORS: Kirillov, P. L., Kolesnikov, V. D., Kuznetsov, V. A., Turchin, N. M.

TITLE: Instruments for Measuring Pressure, Flow, and Level of Molten Alkaline Metals

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 3, pp. 173 - 181

TEXT: The present article deals with problems of construction, design, and application of instruments for measuring pressure, flow, and level of molten alkaline metals. The instruments described here are designed for reactors with liquid-metal coolants. First of all, the authors describe pressure gauges. The simplest method is a connection to a separation tower which is filled with a noble gas (Fig. 1). This method has, however, several disadvantages. The zavod "Manometr" ("Manometr" Factory) developed an inductive pressure transmitter of the diaphragm-type MMC-4 (MMS-4), whose cross-sectional view is schematically shown in Fig. 2. The diaphragm is made of special steel. The range of application of these instruments extends to 10 atm and 450°C (sodium). The two-bellows sealed pressure

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Instruments for Measuring Pressure, Flow, and Level of Molten Alkaline Metals

gauge, made of 1X18H9T (1Kh18N9T) steel, which is shown in Fig. 3, is a simple and dependable instrument. The indication of this pressure gauge is linearly dependent on the ratio of the hardness of the bellows to their cross-sectional area. Fig. 4 gives the calibration of this pressure gauge as a function of A/F. For A/F = 1.25 kg/cm^3, e.g., the calibration scale is shifted by 2.5%. Fig. 5 shows the calibration straight lines of such pressure gauges for bellows of different hardness A (A/F = 10.7, 3.6, and 1.25 kg/cm^3). Formulas are given for the two components of the temperature error. Choke flow-meters with inductive differential diaphragm pressure gauges proved to be unsuitable for flow measurements on sodium. Magnetic flow-meters in which an electromotive force is measured are the simplest and most reliable. Fig. 6 reproduces a photograph of such an instrument designed for BP-5 (BR-5) reactors cooled with liquid sodium. The stability of this instrument largely depends on the material used for the magnet, which must retain its properties at high temperatures for a long time of operation. For this purpose, the authors used the alloy "Magnico", the induction of which as a function of temperature is shown in Fig. 7. Examination of the stability of three flow-meters of this type for one year

Instruments for Measuring Pressure, Flow, and Level of Molten Alkaline Metals

(mean sodium temperature: 400°C) showed that the induction in the pole gaps had decreased by 1% after one month; in the following months, it decreased by 0.5% and less. The results of measurement of the emf between the electrodes are given in tabular form. Fig. 8 schematically shows how the electrodes were welded to the tube. The indication of the flow-meter is slightly influenced by the contact resistance on the inner surface of the tube (cf. Fig. 9). Fig. 10 shows calibration curves at 10 and 200 m^3/hour of flow-meters on a BR-5 reactor. These curves are in good agreement with the theoretical characteristics. In the course of time, iron and nickel particles settle inside the tube at the places of the poles. Fig. 12 reproduces a photograph of the inside of such a tube after 1000 hours of operation (tube diameter: 27 mm). The deposits on the two sides have grown together in the center, and reduce the cross-sectional area of the tube considerably. The error in indication of the flow-meter is 12.5% in this case. Of the various level-meters, the authors first discuss those which are not well suited or even unsuited for reactor operation as, e.g., the УР-4 (UR-4) level-meter which operates without contact and by means of Co^{60} γ-emission, but is unsuited for measurements

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Instruments for Measuring Pressure, Flow, and Level of Molten Alkaline Metals

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on radioactive liquid metals. Furthermore, the authors describe the ultra-short wave level-meter and a potentiometer level-meter suggested by V. D. Kolesnikov. This instrument is schematically represented in Fig. 13. Its construction, especially that of the transmitter (Fig. 14), is described in detail. It has a linear scale, and was tested on a eutectic Na-K alloy at 200°, 300°, and 450°C. There are 14 figures, 1 table, and 4 references: 3 Soviet and 1 US.

SUBMITTED: March 22, 1960

Card 4/4

TURCHIN, N. M.

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems in Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 343 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; I.M. Kirko, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Veldre, Candidate of Physics and Mathematics; V.G. Vitol, Candidate of Physics and Mathematics; Yu.M. Krumin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magnetohydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 35 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and A.I. Oubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

Krumin', Yu.K. Comments on the Paper 251

Savvin, L.G. Optimum Structural Utilization of Induction Pumps 253

Kirillov, P.G., Ya.Ya. Liyelpeteris, A.E. Mikel'son, and G.A. Chumev. Development of Electromagnetic Pumps at the Institute of Physics, Academy of Sciences, Latvian SSR 261

Turchin, N.M. Comments on the Paper 269

Verte, L.A. Use of Induction Pumps in the Foundry and Metallurgical Processes 271

Vol'dek, A.I. Certain Problems in Designing Linear Induction Pumps 273

Verte, L.A. Comments on the Paper 277

Shcherbinin, E.P. Problem of an "Electromagnetic Crucible" 279

Card 11/12

DROBYSHEV, A.V.; TURCHIN, N.M.

Power loss and the initial shaft torque in a seal of forzen sodium. Atom.energ. 10 no.4:386-387 Ap '61. (MIRA14:4)
(Sodium)

AVILOVA, Ye.M.; DOKTOROVA, T.V.; LUTIKOV, V.K.; MARIN, N.I.; POVSTEN', V.A.; TURCHIN, N.M.

Construction features and test results of conduction pumps. Mag. gidr. no.3:121-126 '65. (MIRA 18:10)

AVILOVA, Ye.M.; DOKTOROVA, T.V.; MARIN, N.I.; POVSTEN', V.A.; TURCHIN, N.M.

Design and operation of helical induction pumps. Mag. gidr. no.1:110-114 '65. (MIRA 18:5)

TURCHIN, N.M.

Magnetic flowmeters. Mag. gidr. no.1:147-153 '65. (MIRA 18:5)

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AUTHORS: Drobyshev, A. V., Turchin, N. M.

TITLE: Power losses and initial shaft torque in seals of frozen sodium

PERIODICAL: Atomnaya energiya, v. 10, no. 4, 1961, 386-387

TEXT: Tests have shown that seals of frozen sodium are one of the most reliable shaft seals in sodium pumps, although the power loss due to friction is a great disadvantage. These power losses amount to several kw. An exact measurement of such losses has not yet been possible because the operating conditions of the seal are partly unknown. The experiments described in this "Letter to the Editor" were conducted in order to determine the power losses due to friction in seals of frozen sodium. For this purpose, a device was built, in which the sodium pump described in Ref. 1 (P. L. Kirillov et al. Atomnaya energiya, 7, vyp. 1, 11, (1959)) was used. In the part containing the frozen sodium, temperature measurements were made at 18 points with the use of thermocouples. The rotation of the shaft was effected by a d-c motor (1.6 kw). The speed of the motor

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Power losses and...

was measured with a speedometer and a stroboscope. First, the power losses of the electric motor were measured at different speeds and at no-load; subsequently, distilled water was poured in, and friction was examined in the part containing the frozen sodium in the following tests. There, the power loss due to friction was equal to $N = 10^{-11} n^4$, where N is the power (watts) and n the speed (rpm). In the final tests, water was replaced by sodium having a temperature of 400°C. The results obtained from water and sodium were the same. A graphical representation shows that the measured values are distributed about a straight line from which the power losses due to the seal of frozen sodium were found to be not higher than 0.7 - 1 %. The leakage of sodium through the seal reaches 2 - 3 cm^3 a day. The thickness of the liquid sodium film was estimated to be 15 - 20μ. Fig. 2 illustrates the thermal distribution with respect to the height, l, of the seal for different freezing intensities. Other tests were concerned with a measurement of the initial torque, which was done by means of a dynamometer of the type ДС-0,2 (DS-0.2), which had been fastened by an arm to the shaft of the device. The torque, being very small in liquid sodium, showed a sharp increase when the temperature dropped below the freezing point. The thermal distribution was measured simultaneously in order to

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Power losses and...

obtain the contact area of the seal with the frozen sodium. The measurements are illustrated by Fig. 2 (tangential stress τ versus temperature). τ tangential stress and torque are interrelated by $\tau = 2M/\pi hd^2$ kg/cm^2, where M is the moment (kg·cm), h the level of frozen sodium (cm), and d the diameter of the seal (cm). The power losses were not altered by an increase in the pressure of the frozen sodium from 1 to 4 atm. There are 3 figures and 2 Soviet-bloc references.

SUBMITTED: December 10, 1960

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Power losses and...

Legend to Fig. 2: 1) Schematic representation of the seal.

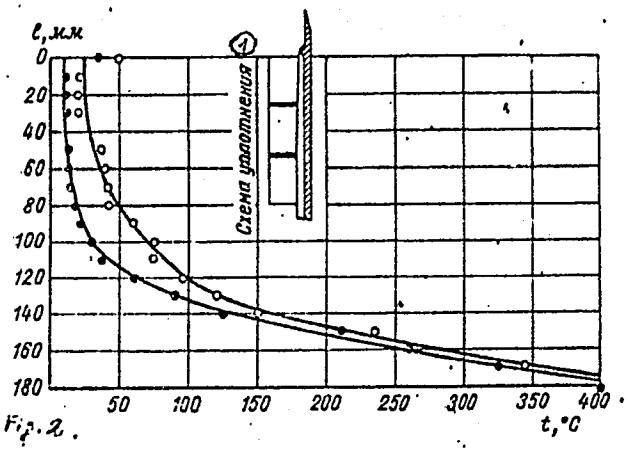

Fig. 2.

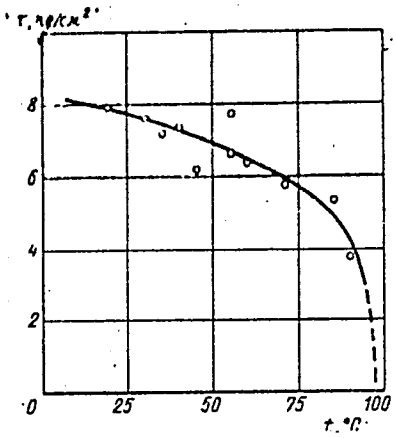

Fig. 3

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77210
SOV/89-8-1-4/29

AUTHORS: Kirillov, P. L., Kozlov, F. A., Subbotin, V. I., Turchin, N. M.

TITLE: Purification of Sodium From Oxides and Methods of Control of Oxide Content

PERIODICAL: Atomnaya energiya, 1960, Vol 8, Nr 1, pp 30-36 (USSR)

ABSTRACT: Oxides in sodium used in liquid heat exchangers in reactors produce corrosion and tend to produce deposits in cooler parts of the contours which can cause clogging. The authors investigated, therefore, cold traps for oxides and a plug indicator for oxides. They wanted to avoid chemical methods which, besides being complicated and time-consuming, become extremely complex in the case of radioactive sodium. The setup on Fig. 2 utilizes the well-known relation between the solubility of oxygen in sodium and its temperature:

$$W = 2{,}7 \cdot 10^{-4} \left(\frac{t}{100}\right)^{3{,}6} \qquad (1)$$

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where W is solubility of oxygen (% weight); t is temperature ($^{\circ}$ C). It makes possible determination of oxide content. As soon as the temperature drops below the temperature of saturation for oxides in sodium, precipitation takes place, clogging the slots on the main valve, and the flow of sodium decreases as shown in Fig. 3. The authors varied oxygen concentration from 0.002 to 0.1% weight, the temperature from 110 to 550° C, and the size of slots from 0.5 x x 0.5 mm to 1 x 1 mm. The number of slots should be 10 to 15 to reduce effects of accidental clogging. The readings were independent of the cooling rate of sodium while the oxygen concentration varied between 0.008 and 0.02% weight, the metal velocity between 2.5 and 13 m/sec, and the rate of decrease of the valve temperature between 0.3 and 37° C/min. Table 3 shows comparative data from the method described here and the chemical analysis. The authors investigated the cold trap shown in Fig. 5. On this figure, 1

Purification of Sodium From Oxides and Methods of Control of Oxide Content

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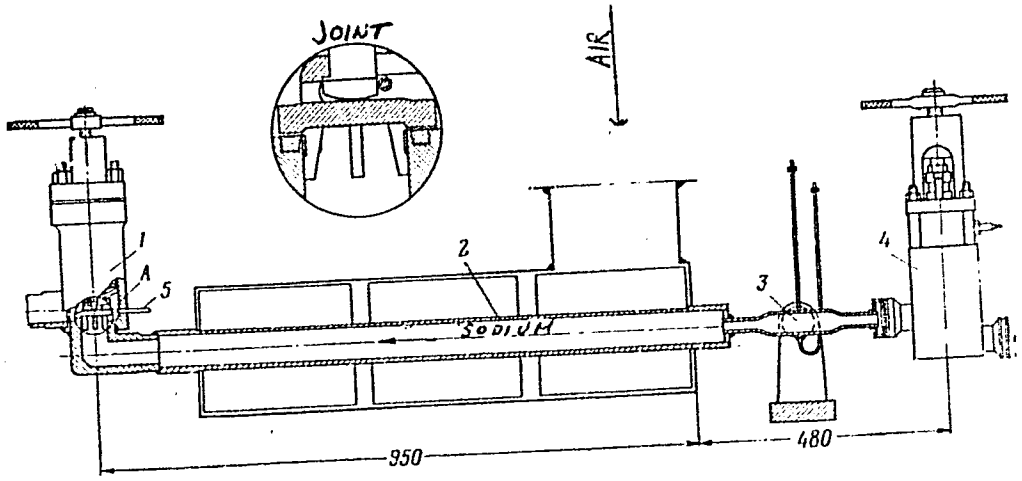

Fig. 2. Construction of plug indicator of oxides: (1) basic valve with radial slots in the disk stopping the oxide; (2) sodium-air heat exchange; (3) flow meter; (4) throttle valve; (5) thermocouple for temperature measurements at the clogging spot.

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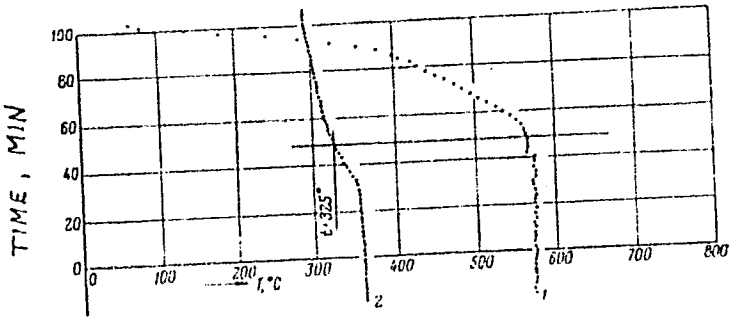

Fig. 3. Examples of registered curves of flow and temperature of sodium on the iterative (secondary) oxide indicator. (1) Emf of magnetic flow meter; (2) temperature of the flap of the basic valve.

Table 3. Oxide content in the trap determined by the two methods, in g.

Number of the trap	Data from the indicator of oxides	Data from the gas analysis
1	890±100	1,000±500
10	4,750±700	6,200±900

Purification of Sodium From Oxides and Methods of Control of Oxide Content

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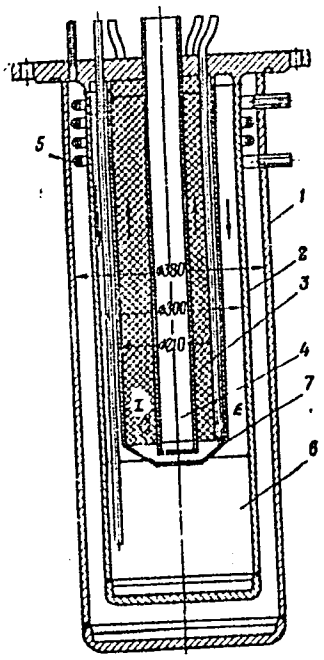

Fig. 5. Construction of cold trap. Capacity, 32 l of sodium.

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represents a jacket containing toluol as cooling agent. Toluol evaporates and then condenses on the water-cooled tubing 5. 2 is the main cylindrical container, with an inner cavity filled with chips or wires from stainless steel. This setup is safe against possible escape of sodium. 6 is a settling tank for oxides, and the cone 7 slows down the flow of metal through the settler. A nichrome heater at 4 provides preliminary heating. The reduction of oxygen concentration in sodium can be computed from the equation of matter balance:

$$\gamma V dc = \gamma Q (c - c') d\tau, \qquad (2)$$

where V is volume of sodium in the contour in m^3; c is concentration of oxygen in sodium in % weight; c', solubility of oxygen in the metal at temperature t' in

% weight (t' is lowest temperature of the metal in the trap); Q flow of metal through the trap in m^3/h; γ, specific gravity of the metal at the temperature of the contour, in kg/m^3; τ, operating time of the trap in hours. After discussing the conditions of validity of Eq. (2), the authors perform the integration and obtained:

$$c = c' + (c_0 - c')\, e^{-n} \qquad (3)$$

where c_0 is original concentration of oxygen in sodium; n is number of times the whole amount of sodium passed through the trap during time τ ; $n = \frac{Q\tau}{V}$. This equation was used as a check on experimental results since a removal of oxides from the trap raised the experimental points above the calculated ones. The authors give detailed data about experimental results

with two traps of different sizes. They concluded that the cold trap can reduce the content of oxygen in sodium down to 0.002% weight, that any required reduction is possible by proper adjustment of operating conditions, that the efficiency of the trap increases after some oxides are already deposited; that chips in the trap work better than wire of 0.5 mm diameter, and that the capacity of the trap increases with the flow velocity. The authors measured also the variation of the concentration of oxygen as a function of n (the experimental points follow quite well the theoretical curve from Eq. (3)) and the longitudinal temperature distribution inside the trap. There are 4 tables; 7 figures; and 15 references, 8 Soviet, 2 U.K., 5 U.S. The 5 most recent U.K. and U.S. references are: A. McIntosh, K. Bagley, J. Brit. Nucl. Energy Conference, 3, Nr 1, 15 (1958); J. White, Nucl. Sci. Abstrs., 15, 8290 (1957); O. Salmon, T. Cashman, J. Inst. Metals,

Purification of Sodium From Oxides and Methods of Control of Oxide Content

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SUBMITTED: April 20, 1959

Card 10/10

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L 11239-66 EWT(d)/EWT(l)/EWT(m)/EWP(w)/EPF(n)-2/EWP(v)/T-2/EWP(t)/EWP(k)/EWP(b)/
ACC NR: AP5024912 EWA(h)/ETC(m)-6 JD/WW/JG/EM UR/0382/65/000/003/0121/0126

AUTHOR: Avilova, E.M.; Doktorova, T.V.; Lutikov, V.K.; Marin, N.I.; Povsten', V.A.; Turchin, N.M.

36
B

ORG: None

TITLE: Design features and test results of conductional pumps

SOURCE: Magnitnaya gidrodinamika, no. 3, 1965, 121-126

TOPIC TAGS: magnetohydrodynamic pump, electromagnetic pump design, unipolar generator

26

ABSTRACT: Design features of several conductional (direct current electromagnetic induction) pumps developed by the authors are described. Results of tests and comments on actual use are also given. A unipolar direct current generator developed as a better power source for one of the pump types is also described. The larger electromagnetic induction pump operating on the principle of DC current conductance in a perpendicular steady magnetic field was designed to pump liquid metals, such as Na and the NaK alloy at temperatures of 850 - 1050°K. It delivers a metal flow of 7,000 cubic centimeters per second. The pump requires 10000 amperes at .6 volt, and has a winding of two turns of an (80x80)mm^2 cross-section. Details of the working section, pressure dependence upon flow at various current magnitudes, and the efficiency variation data are given. A maximum efficiency of 36% was attained at 6000 amperes and 6000 cm^3/sec.

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L 11239-66

ACC NR: AP5024912

The rectifiers usually used as power supply for these pumps (type ND 10000/5000 and ANG 5000/2500) require an exorbitantly large floor space; this led to the development of a compact unipolar generator of 11 kw d.c. power (15,000 amperes, .7 volt), with liquid metal (mercury) brushes. A description and a schematic drawing of the generator is given. In tests, the generator achieved an efficiency of 76%. For smaller liquid metal flows, of several cubic centimeters per second, - helical channel conductional pumps are quite appropriate. They have been designed to deliver e.g. 2 cm^3/sec. of liquid metal at 800°K, using a current of only 100 - 200 amperes. Therefore, their power requirements can be supplied by small compact rectifiers. The simplicity and reliability of these pumps recommend them for use e.g. in laboratories. Orig. art. has 7 figures.

SUB CODE: 13, 09/ SUBM DATE: 26Jan65/

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Card 2/2

NOVIKOV, I.T.; NEPOROZHNIY, P.S.; GANICHEV, I.A.; LAVRENENKO, K.D.; FINOGENOV, Ya.I.; ALEKSANDROV, D.Ya.; SERDYUKOV, N.P.; KUDRYAVTSEV, L.N.; PETROV, A.N.; BANNIK, V.P.; VOLKOV, I.M.; MEL'NIKOV, B.V.; STAROSTIN, I.A.; BUBNOVSKIY, G.A.; SUVORIN, F.Ya.; GRITSAY, B.I.; SKUPKOV, A.A.; BAMSHTEYN, Ye.B.; TURCHIN, N.Ya.

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In 1949 the boiler house at a TETs (District heating and power plant, name illegible) was enlarged. It was necessary to build temporary low walls. [illegible] how this was done, with clay concrete, using steel casing molds. Work was done in one month without skilled bricklayers. Includes diagram and photograph.

PA 158T16

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